APPENDIX C

PM2.5 Continuous Monitor Comparability Assessment and Request for Waiver

Introduction

The SCAQMD monitoring program has historically operated PM2.5 continuous monitors primarily to support forecasting and reporting of the Air Quality Index (AQI). These monitors supply data every hour to update the AQI on our web site as well as national web sites such as AirNow (www.airnow.gov). SCAQMD has been using these monitors since the early part of the last decade as the PM2.5 monitoring program was implemented. Over the last few years, a number of PM2.5 continuous monitors have been approved as Federal Equivalent Methods (FEMs). By utilizing an approved FEM, any subsequent data produced from the method may be eligible for comparison to EPA's health based standard known as the NAAQS. The primary advantage of operating a PM2.5 continuous FEM is that it can support the AQI, while also supplying data that are eligible for comparison to the NAAQS. Thus, a network utilizing PM2.5 continuous FEMs can potentially lower the number of filter-based FRMs operated in the network, which are primarily used for comparison to the NAAQS. These filter-based FRMs are resource intensive in that they require field operations as well as pre- and post-sampling laboratory analysis which results in data not being available for approximately 2-4 weeks after sample collection.

The SCAQMD monitoring program has been evaluating PM2.5 continuous FEMs over the past several years. Although the PM2.5 continuous FEMs are automated methods, these methods still require careful attention in their set-up, operation, and validation of data. Once enough data was collected, we began to evaluate the performance of these methods compared to collocated FRMs. That evaluation is explained further below and includes our request regarding the use of the data from these methods.

Request for Exclusion of PM2.5 Continuous FEM data from Comparison to the NAAQS

The network technical requirements for requesting exclusion of data from comparison to the NAAQS are identified in 40 CFR §58.11(e). These requirements refer to the performance criteria

described in Table C-4 to subpart C of part 53. To accommodate the differences in how routine monitoring agencies operate their networks, several additional provisions are described in §58.11(e). When a topic is not addressed in §58.11(e), then the test specifications from table C-4 applies.

As shown in the Table below, the slopes of the regression between collocated FRM and FEM measurements at the Anaheim, Central Los Angeles, North Long Beach, South Long Beach, and Rubidoux (POC 3) stations are higher than 1.1, which is outside the test specification indicated in §53 Table C-4 (i.e. slope = 1 ± 0.1). Although the slope criteria was met for Anaheim, Rubidoux, and Mira Loma (Central LA and South Long Beach failed intercept test), the intercept of the regression relationship between FRM and FEM data of ±2.0 (also indicated in §53 Table C-4) failed for Anaheim (5.06), Central LA (4.51), Rubidoux (3.37), and Mira Loma (4.98). Failure of one or both criteria in the EPA equivalency acceptance "box test" was observed at all FEM/FRM paired sites in the SCAQMD jurisdiction for PM2.5 monitoring.

Thus, in accordance with the PM NAAQS rule published on January 15th, 2013 (78 FR 3086) and specific to the provisions detailed in §58.10 (b)(13) and §58.11 (e), SCAQMD is requesting that data from the all of the SCAQMD FEM PM2.5 monitors be set aside for comparison to the NAAQS. While SCAQMD is working to optimize the monitoring instrumentation to meet all of our monitoring objectives, the performance is not yet at a point where the comparability of the PM2.5 continuous FEMs operated in our network compared to collocated FRMs is acceptable. After assessing the comparability of the PM2.5 FEMs to the collocated FRMs for our network, the sites listed below do not meet the comparability requirements. Detailed one-page assessments from which the information described below was obtained are included at the end of this section.

Table – Request for Exclusion of PM2.5 Continuous FEM Data

Site Name	City	Site ID	Cont POC	Cont Method Description	$PM_{2.5}$ Cont Begin Date	$PM_{2.5}$ Cont End Date	Continuous/ FRM Sampler Pairs Per Season	Slope (m)	Intercept (y)	Meets Bias Requirement	Correlation (r)
Sites with $PM_{2.5}$ continuous FEMs that are collocated with FRMs											
Anaheim	Anaheim	06-059-0007	3	Met-One BAM 1020 w/VSCC	01/01/2013	12/31/2015	Winter = 241 Spring = 252 Summer = 241 Fall = 214 Total = 948	0.99	5.06	No	0.85
Central Los Angeles	Los Angeles	06-037-1103	3	Met-One BAM 1020 w/VSCC	01/01/2013	11/16/2015	Winter = 232 Spring = 244 Summer = 236 Fall = 211 Total = 923	1.18	4.51	No	0.91
South Long Beach	Long Beach	06-037-4004	3	Met-One BAM 1020 w/VSCC	01/03/2013	12/31/2015	Winter = 201 Spring = 248 Summer = 253 Fall = 243 Total = 945	1.21	1.22	No	0.91
Riverside/ Rubidoux	Rubidoux	06-065-8001	9	Met-One BAM 1020 w/PM2.5 SCC	01/01/2013	12/31/2015	Winter = 232 Spring = 244 Summer = 255 Fall = 247 Total = 978	1.12	2.86	No	0.62
Mira Loma	Riverside	06-065-8005	3	Met-One BAM 1020 w/VSCC	01/01/2013	12/31/2015	Winter = 262 Spring = 236 Summer = 245 Fall = 232 Total = 975	0.99	4.98	No	0.89

Period of Exclusion of Data from the PM2.5 Continuous FEMs

The above table details the period of available data by monitor on which the request to exclude PM2.5 continuous FEM data is based. Per EPA Regional Office approval, these data will be entered into EPA's AQS database in a manner where the data are only used for the appropriate monitoring objective(s) (i.e., use data for just the AQI). Additionally, SCAQMD will continue to load any new data generated for the next 18 months (intended to represent the period until December 31 of 2017) in the same manner or until such time we request and receive approval from the EPA Regional Office to change the status of these monitors.

PM2.5 Continuous FEM data for Reporting the AQI

While the analysis supports the request for the monitors above not be used for comparison to the NAAQS, the data are of sufficient comparability to collocated FRMs that they be used for public AQI reporting. Therefore, with EPA Regional Office approval we will report these data on our web site and to AIRNow (www.airnow.gov). As such, data submitted to EPA's AQS database will be under "acceptable AQI" reporting (i.e., parameter code 88101) so that data users will know that these data are appropriate for use in AQI calculations, but not NAAQS comparison.

Assessments

The following one-page assessments are locations where our agency has collocated PM2.5 FRM and continuous FEM monitors. Each of these assessments is represented in the "**Table – Request for Exclusion of PM2.5 Continuous FEM Data"** above.

Anaheim

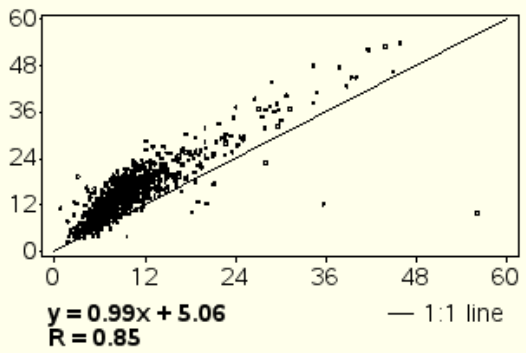
(FRM POC: 1; FEM POC: 3)

PM 2.5 Continuous Monitor Comparability Assessment

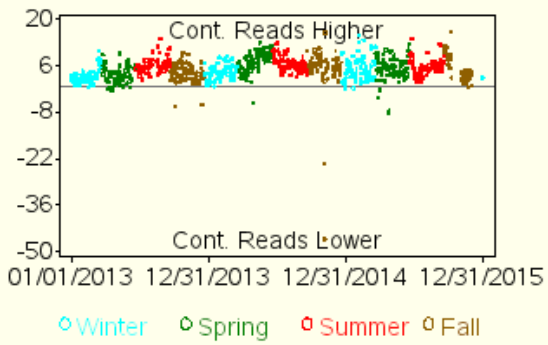
Site 06-059-0007: Anaheim, CA

FRM: Andersen RAAS2.5-300 PM2.5 SEQ w/WINS - GRAVIMETRIC (120), PM2.5 - Local Conditions (88101), POC=1
Cont: Met-one BAM-1020 W/PM2.5 SCC - Beta Attenuation (170), Acceptable PM2.5 AQI & Speciation Mass (88502), POC=3

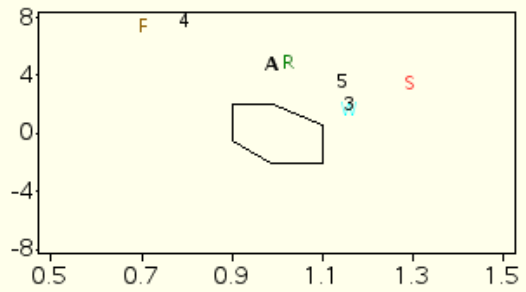
Cont. (y) vs. FRM (x) $PM_{2.5}$ ($\mu g/m^3$)



Cont. minus FRM $PM_{2.5}$ ($\mu g/m^3$)

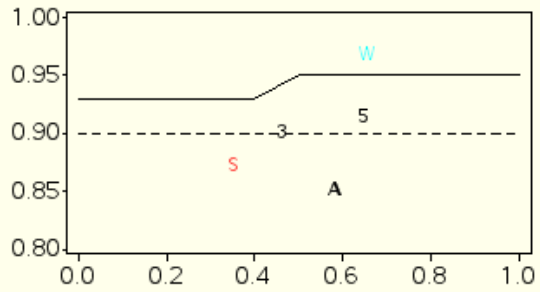


Additive (y) vs. Multiplicate (x) Bias



A=AllData, 3=2013, 4=2014, 5=2015
W=Winter, R=Spring, S=Summer, F=Fall

R (y) vs. FRM CCV (x)



A=AllData, 3=2013, 4=2014, 5=2015
W=Winter, R=Spring, S=Summer, F=Fall

Mean $PM_{2.5}$ ($\mu g/m^3$)

Dataset	N	FRM	Cont	Ratio (Cont/FRM)
AllData	**948**	**10.1**	**15.1**	**1.49**
Winter	241	13.0	16.9	1.30
Spring	252	8.7	14.0	1.61
Summer	241	8.5	14.6	1.72
Fall	214	10.4	15.0	1.44
2013	314	10.2	14.1	1.38
2014	339	10.5	16.3	1.55
2015	295	9.6	14.8	1.55

Appendix A Statistics

Dataset	N (all observations)	Bias	N (only >= 3 ug/m^3)	Bias
AllData	**948**	**60.1**	**934**	**57.7**
Winter	241	35.9	233	34.1
Spring	252	66.6	251	65.8
Summer	241	78.0	238	75.5
Fall	214	59.7	212	53.9
2013	314	41.7	309	40.9
2014	339	72.7	337	69.2
2015	295	65.3	288	62.1

Data Source: EPA AQS Data Mart

Generated on: May 6, 2016

Central Los Angeles

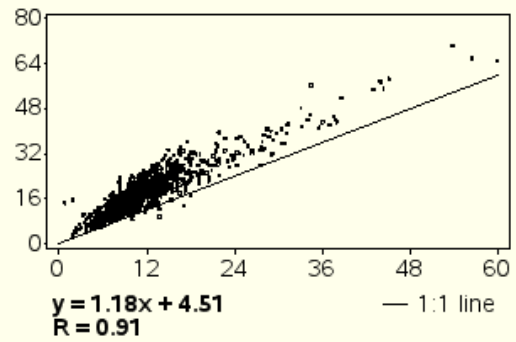
(FRM POC: 1; FEM POC: 9)

PM 2.5 Continuous Monitor Comparability Assessment

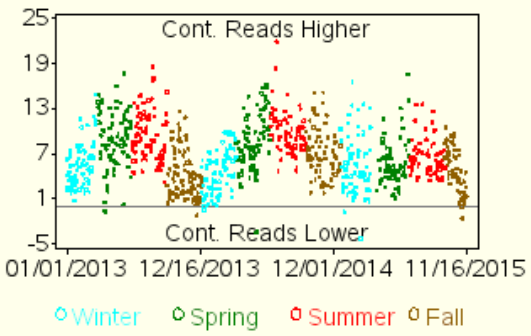
Site 06-037-1103: Los Angeles, CA

FRM: R & P Model 2025 PM-2.5 Sequential Air Sampler w/VSCC - Gravimetric (145,120), PM2.5 - Local Conditions (88101), POC=1
Cont: Met-one BAM-1020 W/PM2.5 SCC - Beta Attenuation (170), Acceptable PM2.5 AQI & Speciation Mass (88502), POC=9

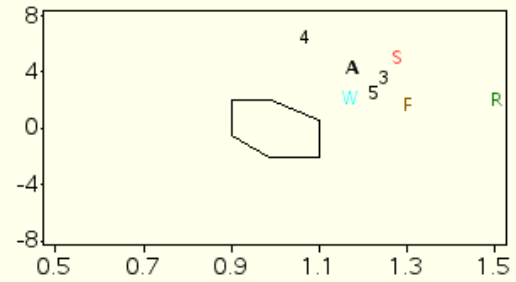
Cont. (y) vs. FRM (x) $PM_{2.5}$ ($\mu g/m^3$)



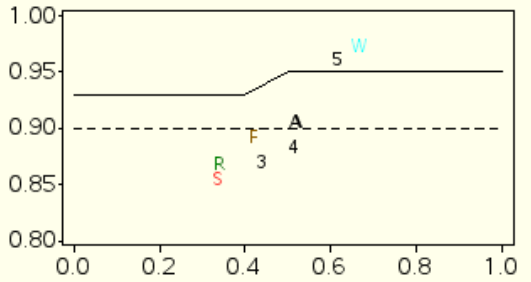
Cont. minus FRM $PM_{2.5}$ ($\mu g/m^3$)



Additive (y) vs. Multiplicate (x) Bias



R (y) vs. FRM CCV (x)



Mean $PM_{2.5}$ ($\mu g/m^3$)

Dataset	N	FRM	Cont	Ratio (Cont/FRM)
AllData	**923**	**12.4**	**19.1**	**1.54**
Winter	232	15.4	20.4	1.33
Spring	244	11.3	19.2	1.70
Summer	236	11.6	20.1	1.73
Fall	211	11.2	16.4	1.47
2013	336	12.1	18.9	1.56
2014	319	12.6	20.2	1.60
2015	268	12.5	18.1	1.45

Appendix A Statistics

Dataset	N (all observations)	Bias	N (only >= 3 ug/m^3)	Bias
AllData	**923**	**62.2**	**913**	**59.4**
Winter	232	40.4	225	38.4
Spring	244	71.7	244	71.7
Summer	236	85.5	234	75.9
Fall	211	49.1	210	49.0
2013	336	65.2	332	59.9
2014	319	68.0	318	67.8
2015	268	51.5	263	48.5

Data Source: EPA AQS Data Mart

Generated on: May 6, 2016

South Long Beach

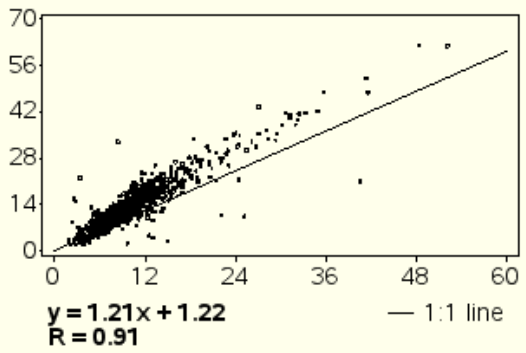
(FRM POC: 1; FEM POC: 3)

PM 2.5 Continuous Monitor Comparability Assessment

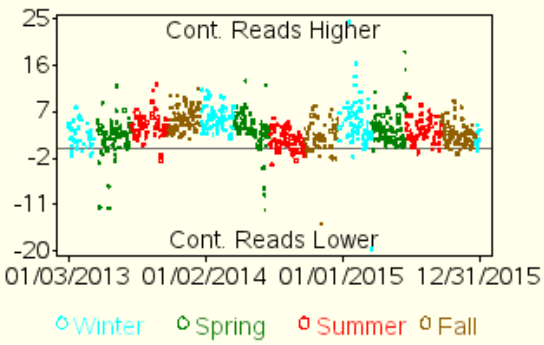
Site 06-037-4004: Long Beach, CA

FRM: Andersen RAAS2.5-300 PM2.5 SEQ w/WINS - GRAVIMETRIC (120), PM2.5 - Local Conditions (88101), POC=1
Cont: Met-one BAM-1020 W/PM2.5 SCC - Beta Attenuation (170), Acceptable PM2.5 AQI & Speciation Mass (88502), POC=3

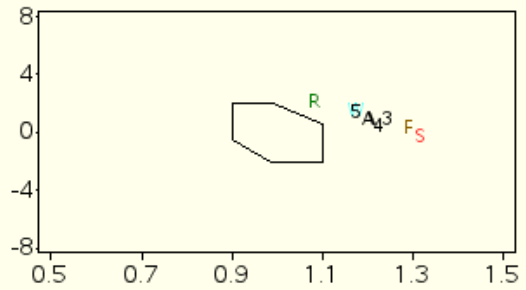
Cont. (y) vs. FRM (x) $PM_{2.5}$ ($\mu g/m^3$)



Cont. minus FRM $PM_{2.5}$ ($\mu g/m^3$)

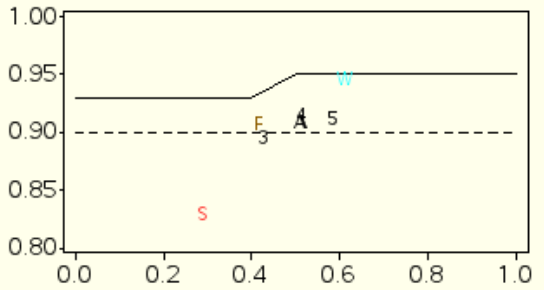


Additive (y) vs. Multiplicate (x) Bias



A=AllData, 3=2013, 4=2014, 5=2015
W=Winter, R=Spring, S=Summer, F=Fall

R (y) vs. FRM CCV (x)



A=AllData, 3=2013, 4=2014, 5=2015
W=Winter, R=Spring, S=Summer, F=Fall

Mean $PM_{2.5}$ ($\mu g/m^3$)

Dataset	N	FRM	Cont	Ratio (Cont/FRM)
AllData	**945**	**10.6**	**14.0**	**1.32**
Winter	201	14.3	18.7	1.30
Spring	248	9.3	12.4	1.34
Summer	253	9.1	11.9	1.31
Fall	243	10.5	14.1	1.34
2013	298	10.8	14.6	1.35
2014	306	10.9	14.0	1.29
2015	341	10.2	13.6	1.34

Appendix A Statistics

Dataset	N (all observations)	Bias	N (only >= 3 ug/m^3)	Bias
AllData	**945**	**34.0**	**928**	**33.7**
Winter	201	33.0	195	33.9
Spring	248	38.5	244	36.1
Summer	253	31.1	251	30.3
Fall	243	33.4	238	34.8
2013	298	35.0	293	36.4
2014	306	30.4	301	28.3
2015	341	36.5	334	36.3

Data Source: EPA AQS Data Mart

Generated on: May 6, 2016

Rubidoux

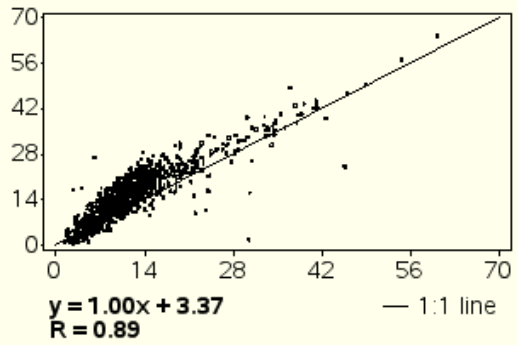
(FRM POC: 1; FEM POC: 9)

PM 2.5 Continuous Monitor Comparability Assessment

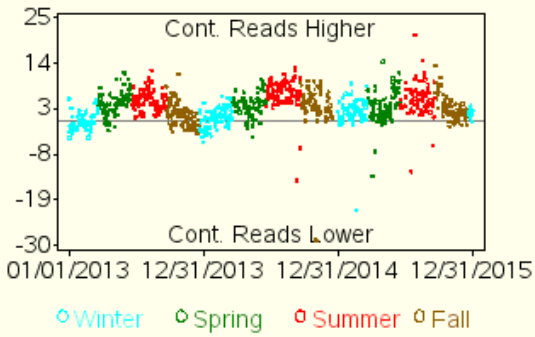
Site 06-065-8001: Rubidoux, CA

FRM: R & P Model 2025 PM-2.5 Sequential Air Sampler w/VSCC - Gravimetric (145,120), PM2.5 - Local Conditions (88101), POC=1
Cont: Met-one BAM-1020 W/PM2.5 SCC - Beta Attenuation (170), Acceptable PM2.5 AQI & Speciation Mass (88502), POC=9

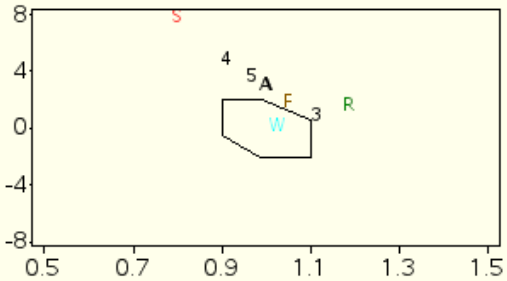
Cont. (y) vs. FRM (x) $PM_{2.5}$ ($\mu g/m^3$)



Cont. minus FRM $PM_{2.5}$ ($\mu g/m^3$)

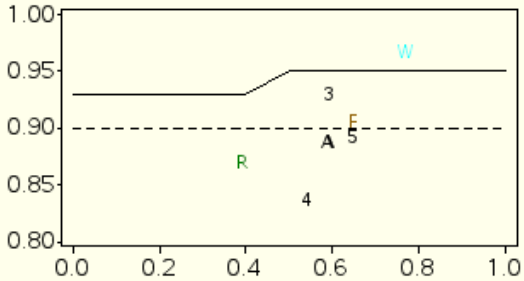


Additive (y) vs. Multiplicate (x) Bias



A=AllData, 3=2013, 4=2014, 5=2015
W=Winter, R=Spring, S=Summer, F=Fall

R (y) vs. FRM CCV (x)



A=AllData, 3=2013, 4=2014, 5=2015
W=Winter, R=Spring, S=Summer, F=Fall

Mean $PM_{2.5}$ ($\mu g/m^3$)

Dataset	N	FRM	Cont	Ratio (Cont/FRM)
AllData	**978**	**12.3**	**15.7**	**1.28**
Winter	232	14.5	15.3	1.06
Spring	244	11.7	15.8	1.35
Summer	255	11.6	17.4	1.50
Fall	247	11.4	14.1	1.23
2013	334	12.5	15.1	1.21
2014	324	12.3	16.4	1.33
2015	320	11.9	15.5	1.30

Appendix A Statistics

Dataset	N (all observations)	Bias	N (only >= 3 ug/m^3)	Bias
AllData	**978**	**32.0**	**948**	**33.0**
Winter	232	7.0	211	8.7
Spring	244	36.9	243	34.9
Summer	255	55.2	255	55.2
Fall	247	26.6	239	28.8
2013	334	18.5	319	21.5
2014	324	39.4	318	41.1
2015	320	38.5	311	36.5

Data Source: EPA AQS Data Mart

Generated on: May 6, 2016

Mira Loma

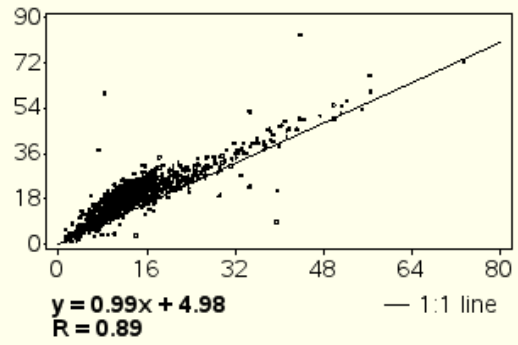
(FRM POC: 1; FEM POC: 3)

PM 2.5 Continuous Monitor Comparability Assessment

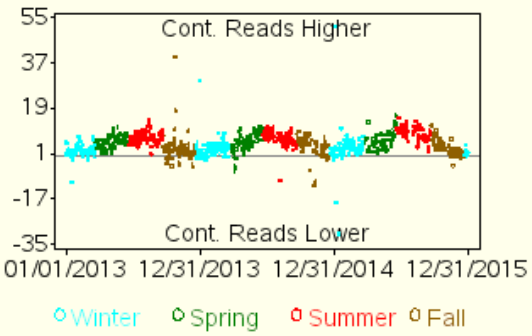
Site 06-065-8005: Mira Loma, CA

FRM: R & P Model 2025 PM-2.5 Sequential Air Sampler w/VSCC - Gravimetric (145,120), PM2.5 - Local Conditions (88101), POC=1
Cont: Met-one BAM-1020 W/PM2.5 SCC - Beta Attenuation (170), Acceptable PM2.5 AQI & Speciation Mass (88502), POC=3

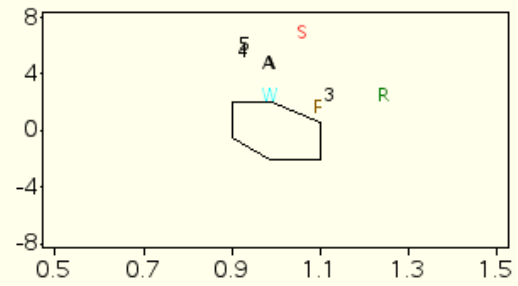
Cont. (y) vs. FRM (x) $PM_{2.5}$ ($\mu g/m^3$)



Cont. minus FRM $PM_{2.5}$ ($\mu g/m^3$)

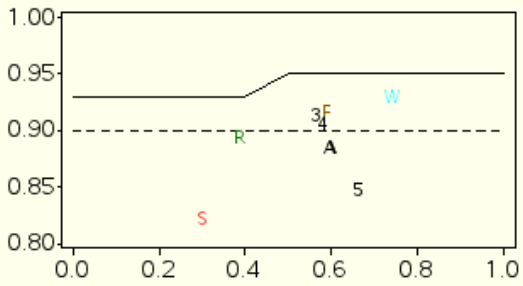


Additive (y) vs. Multiplicate (x) Bias



A=AllData, 3=2013, 4=2014, 5=2015
W=Winter, R=Spring, S=Summer, F=Fall

R (y) vs. FRM CCV (x)



A=AllData, 3=2013, 4=2014, 5=2015
W=Winter, R=Spring, S=Summer, F=Fall

Mean $PM_{2.5}$ ($\mu g/m^3$)

Dataset	N	FRM	Cont	Ratio (Cont/FRM)
AllData	**975**	**14.1**	**18.9**	**1.34**
Winter	262	16.8	19.4	1.15
Spring	236	12.6	18.4	1.46
Summer	245	12.2	20.0	1.64
Fall	232	14.4	17.7	1.23
2013	347	14.1	18.5	1.32
2014	327	14.4	19.2	1.33
2015	301	13.6	19.0	1.39

Appendix A Statistics

Dataset	N (all observations)	Bias	N (only >= 3 ug/m^3)	Bias
AllData	**975**	**42.4**	**949**	**42.6**
Winter	262	25.7	243	24.2
Spring	236	48.9	236	48.9
Summer	245	69.0	245	69.0
Fall	232	26.8	225	27.1
2013	347	35.7	333	36.2
2014	327	40.9	320	41.7
2015	301	51.9	296	50.8

Data Source: EPA AQS Data Mart

Generated on: May 6, 2016